

State in Vertex Form

$$f(x) = -2x^2 - 16x + 7$$

$$f(x) = \frac{1}{2}x^2 + 3x + 4$$

Oct 17-11:04 AM

Completing the Square
Day #3

State in Vertex Form

$$\begin{aligned}
 f(x) &= -2x^2 - 16x + 7 \\
 &= -2(x^2 + 8x) + 7 \\
 &= -2(x^2 + 8x + 16 - 16) + 7 \\
 &= -2(x+4)^2 - 16 + 7 \\
 &= -2(x+4)^2 - 9 \\
 &= -2(x+4)^2 + 39 \\
 &= a(x-h)^2 + k \\
 f(x) &= \frac{1}{2}x^2 + 3x + 4
 \end{aligned}$$

$\left(\frac{8}{2}\right)^2 = 16$
 $(-4, 39)$

Oct 17-10:59 AM

$$f(x) = \frac{1}{2}x^2 + 3x + 4$$

$$f(x) = \frac{1}{2}(x^2 + 6x) + 4$$

$$f(x) = \frac{1}{2}(x^2 + 6x + 9 - 9) + 4$$

$$f(x) = \frac{1}{2}(x+3)^2 - 9 + 4$$

$$f(x) = \frac{1}{2}(x+3)^2 - \frac{9}{2} + 4$$

$$f(x) = \frac{1}{2}(x+3)^2 - \frac{9}{2} + \frac{8}{2}$$

$$f(x) = \frac{1}{2}(x+3)^2 - \frac{1}{2}$$

$$\begin{aligned}
 3 \div \frac{1}{2} \\
 3 \times \frac{2}{1} \\
 = 6
 \end{aligned}$$

$$\left(\frac{6}{2}\right)^2 = 9$$

$$(-3, -\frac{1}{2})$$

Oct 17-11:02 AM

Completing the Square Steps

Partial Factor

b/2 ^2 - c value

add and subtract new c value

make the perfect square

distributive property

group like terms (c value)

$$\begin{aligned}
 f(x) &= -2x^2 + 8x - 17 \\
 f(x) &= -2(x^2 - 4x) - 17 \\
 f(x) &= -2(x^2 - 4x + 4 - 4) - 17 \\
 f(x) &= -2(x-2)^2 + 8 - 17 \\
 f(x) &= -2(x-2)^2 - 9
 \end{aligned}$$

Oct 19-8:39 AM

$$f(x) = \frac{1}{2}x^2 + 3x + 2$$

$$f(x) = \frac{1}{2}(x^2 + 6x) + 2$$

$$f(x) = \frac{1}{2}(x^2 + 6x + 9 - 9) + 2$$

$$f(x) = \frac{1}{2}(x+3)^2 - 9 + 2$$

$$f(x) = \frac{1}{2}(x+3)^2 - \frac{9}{2} + 2$$

$$f(x) = \frac{1}{2}(x+3)^2 - \frac{9}{2} + \frac{4}{2}$$

$$f(x) = \frac{1}{2}(x+3)^2 - \frac{5}{2}$$

$$(-3, -\frac{5}{2})$$

Mar 27-12:52 PM

$$f(x) = \frac{3}{4}x^2 - 5x + 3$$

$$f(x) = \frac{3}{4}(x^2 - \frac{20}{3}x) + 3$$

$$f(x) = \frac{3}{4}(x^2 - \frac{20}{3}x + \frac{400}{36} - \frac{400}{36}) + 3$$

$$f(x) = \frac{3}{4}(x - \frac{20}{6})^2 - \frac{400}{36} + 3$$

$$f(x) = \frac{3}{4}(x - \frac{20}{6})^2 - \frac{1200}{144} + 3$$

$$f(x) = \frac{3}{4}(x - \frac{20}{6})^2 - \frac{1200}{144} + \frac{432}{144}$$

$$f(x) = \frac{3}{4}(x - \frac{20}{6})^2 - \frac{768}{144}$$

$$(\frac{20}{6}, -\frac{768}{144})$$

Mar 27-12:59 PM

$$\begin{aligned}
 f(x) &= 1.7x^2 - 6.8x + 4.7 \\
 f(x) &= 1.7(x^2 - 4x) + 4.7 \\
 f(x) &= 1.7(x^2 - 4x + 4 - 4) + 4.7 \\
 f(x) &= 1.7[(x-2)^2 - 4] + 4.7 \\
 f(x) &= 1.7(x-2)^2 - 6.8 + 4.7 \\
 f(x) &= 1.7(x-2)^2 - 2.1 \quad (2, -2.1)
 \end{aligned}$$

Mar 27-1:07 PM

$$\begin{aligned}
 f(x) &= -2x^2 - 10x + 16 \\
 f(x) &= \frac{1}{3}x^2 - 6x + 14
 \end{aligned}$$

Oct 17-10:29 AM

$$f(x) = \frac{3}{2}x^2 - 18x - 16$$

Oct 17-10:30 AM